

CHAPTER 4

STORM DATA REQUIREMENTS AND DEPOSITION

4.1 General. Data requirements of the participating agencies for the events identified in the Terms of Reference were developed by the WG/NDR/PSDA members and represents data routinely acquired or which may be acquired within the existing operational capabilities of the participating agencies. Sections 4.2, 4.3, and 4.4 address data deposition. In general, the raw data will reside with the acquiring agency.

4.2 Atmospheric Data. The primary source of atmospheric data accompanying a tropical or extratropical storm is NOAA. In principle, all agency data requirements are usually met by NOAA. USDA may provide additional surface-wind data should the storm system affect an area where USDA instrumentation is resident.

4.3 Hydrodynamic Data. Examples of hydrodynamic data include coastal wave climate and water levels, coastal surface and bottom currents, beach wave runup and uprush, and breaking wave and overtopping of coastal structures. Surface and bottom current, and remotely sensed offshore and near-coast wave data are very useful to describe the hydrodynamic environment during coastal storms but usually are not acquired. The technology to acquire remotely sensed wave data from aircraft exists but requires modification of the fuselage of the supporting aircraft to accommodate the radar antenna -- a requirement likely to reduce the number of candidate aircraft.

Surface current data during coastal storm events feasibly may be acquired by use of a Bragg-scatter radar (e.g., Ocean Surface Current Acquisition Radar). The logistic difficulty of deploying such a radar at a suitable site in advance of a land-falling storm will be considerable, as will the risk of damage or loss. While the acquisition of bottom current data is entirely within the capability of present in situ technology, the logistic difficulties of instrument deployment prior to and recovery after the event are formidable.

Given the difficulty and presumed accompanying expense of acquiring remotely sensed wave data and current data (both surface and bottom), efforts to acquire these data should be undertaken with specific needs and applications in mind.

In the most general sense, acquisition of hydrodynamic data serves to support the USACE's broad missions of shore protection and restoration, navigation, and characterization of estuarine circulation and water quality properties. Acquisition of all hydrodynamic data that support these missions is desirable.

4.3.1 Riverine Flooding Data. Hydrodynamic data required to assess riverine flooding, but usually not acquired, include streamflow discharge and current velocities. The USGS and some USACE districts maintain field crews capable of making the necessary measurements. During floods, these teams are routinely deployed at stream gages and occasionally at major engineering structures in order to measure streamflow, but they are relatively few in number and provide only

sparse coverage of many rivers and communities subject to flooding. Closer coordination between the USGS and USACE and improved communication with NOAA flood forecasting operations can enable efficient national deployment of these limited resources to enhance forecasts and document riverine flow magnitudes, which are among the most perishable data.

New technologies, such as the acoustic Doppler current profiler can increase the level of measurement detail and speed data collection, but they are expensive to deploy. Therefore, early consultations among WG/NDR/PSDA members, especially USGS and USACE representatives, should include consideration of detailing such equipment and crews for their operation from USGS and USACE districts in other areas of the Nation. However, such details are also expensive, disrupt normal operations, and require expenditure of scarce internal funds or reimbursement from interested agencies, such as FEMA.

4.4 Morphological Data. Morphological data include shoreline changes both above and below the high-tide contour. In principle, at least one of the participating agencies usually acquires needed morphological data except for pre-event shoreline topography. Acquisition of pre-event shoreline topography is probably feasible only by means of aerial photogrammetry, and only then under favorable conditions (i.e., daylight and minimal cloud cover).

An alternative to aerial photogrammetry for rapid mapping of the pre-/post-event shoreline and nearshore bathymetry is the Scanning Hydrographic Observational Airborne Laser System operated by the USACE Mobile District and flown aboard NOAA Aircraft Operations Center aircraft. The system uses a aircraft-mounted down-looking laser to acquire bathymetric data in shallow water environments and is coupled to a high accuracy GPS-based positioning system which permits mapping of the adjoining super-aqueous sections of coastline. The system is rapid enough that kilometers of shoreline can be mapped in minutes.

As with the acquisition of surface and bottom current data, acquisition of pre-event shoreline topography data should be undertaken only with specific needs and applications in mind. Changes in flood plains need to be documented to ensure accurate river forecasts. Delineation of changes in river channels and levee breaches can be made using some combination of field surveys, aerial photography, and interpretation of satellite information.